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ABSTRACT

Use of contextual cues in language comprehension by hearing impaired persons is considered in two sections. The first section summarizes a study of how 21 hard of hearing children (7-12 years old) used contextual cues to identify words in sentences heard from a tape recorder. Results are explained to indicate that identification of words on the basis of auditory cues is often difficult for hearing impaired children. The second section presents a proposal for a study on the use of contextual cues in the comprehension of interpreted lectures. (Author/CL)

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Use of Contextual Cues in Language Comprehension by Hearing-Impaired Persons.

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Abstract

Use of contextual cues in language comprehension by hearing impaired persons is considered in two sections. The first section summarizes a study of how hard-of-hearing children use contextual cues to identify words in sentences heard from a tape recorder. The second section presents a proposal for a study on use of contextual cues in the comprehension of interpreted lectures.

Use of Contextual Cues in Language Comprehension by

Hearing-Impaired Persons

My interest in language comprehension of hearing-impaired persons began during my dissertation which compared certain achievement behaviors of normal hearing and hearing-impaired children. While conducting this research, I became aware that hearing-impaired children's achievement behavior could not be understood without also considering their comprehension of the language used for eliciting the achievement behavior. Although a difference was found in the achievement behavior of the normal-hearing and the hearing-impaired, it was questionable whether the hearing impaired responded differently because they had difficulty comprehending the instructions or because, even though they understood the instructions, they had previously learned to avoid challenging situations.

My presentation is divided into two parts. In the first part I'll summarize a study of how hard-of-hearing children use contextual cues to identify words in sentences heard from a tape recorder. In the second section, I'll present a proposal for a study on use of contextual cues in the comprehension of interpreted lectures. An interpreter will interprete the second part of the presentation in order to give you some idea of what interpreting is like.

Hearing-Impaired Children's Use of Contextual Cues in Spoken Sentences to Identify Words.

Psycholinguistic studies with normal-hearing persons indicate that contextual cues evoked by the meanings of certain words and by word

order facilitate the identification of other words by restricting the number of possible responses (e.g. Leventhal, 1973). The listener grasps the meaning of the context and somehow uses this information to assign meanings to subsequent words that are consistent with the central idea for the setence. Context is defined here as the set of words in a sentence that provides syntactic and semantic information and primes a listener to expect particular member words.

Hearing-impaired children may be able to use sentence context in some circumstances, but the extent to which these individuals can use context is not clear. It may be possible for impaired hearers to extract enough contextual information from words that are intelligible to partly compensate for words that are not intelligible. On the other hand, the decrement in hearing ability may force the individual to code each word as he hears it if he cannot identify enough words to serve as a contextual base. Furthermore, implicit knowledge of English syntax and semantics of severely impaired hearers is sometimes different than that of normal hearers; consequently, the impaired hearer's knowledge of English may influence his use of context in speech perception differently than it influences that of normal hearers (Bornstein, Woodward and Tully, 1975; Erber, 1975).

I conducted a study with hearing-impaired children to determine how extensively they use contextual cues. Children heard three sets of sentences.

For two sets of sentences, one word provided context to influence identification of a second word that is difficult to identify on the basis of its acoustic cues alone. These sentences were varied so that the relations between word meaning were reasonable for one set and

unreasonable for the second set. For a third set of sentences, the context was neutral with respect to the to-be-identified word Table 1 provides examples of each type of sentence.

Insert Table 1 about here

In Sentence 1a (Table 1), girl can be a contextual cue that primes pail, but dog would not be expected to prime pail. Sentences were reasonable and unreasonable in terms of whether the words fit together so that they made sense- sense in terms of meaning. In Table 1, Sentences 1a and 2a make sense, but 1b and 2b do not, as should be clear from one's implicit knowledge about the meaning of these words.

The procedure required the cild to identify the correct word from two alternatives (e.g. pail and tail) to permit study of the relationship between phoneme confusability and use of sentence context. For example, pail and tail are two words the impaired listener is likely to confuse, but knowledge about relations between word meanings can make it clear which of these acoustically confusing words is more appropriate. The alternatives for the to-be-identified word always differed by one consonant.

Knowledge about relations between word meanings pertained to the child's implicit knowledge about how well the meaning of the test word fitted with the semantic information provided by the other words in the sentence (Perfetti 1972; Kleiman, 1977). I assume that the biasing word (e.g. girl) operated in conjunction with the other words in the context in providing semantic information.

Method

Subjects were 21 hearing-impaired children enrolled in programs for the hearing-impaired at local public schools. Age in years ranged from 7 to 12, and severity of hearing loss, as measured by the average of the pure-tone thresholds in the speech range for the better ear, ranged from 60-103 dB (with a mean of 79.8 dB); i.e. they generally had severe but not profound hearing losses. Immediately after hearing each sentence over headsets, the child saw one of the cards depicting a test word and an alternative word. Selection of the picture for the word in the just-presented sentence constituted the measure of performance.

Results and Discussion

Data analyses revealed that children made significantly more correct word identifications when the context was reasonable than when it was unreasonable. Also as predicted, children made significantly fewer correct identifications when the sentence was unreasonable than when it was neutral. Finally, children made more correct identifications when the context was reasonable than when it was neutral although the difference was not statistically significant.

These results suggest that identification of words on the basis of auditory cues is often quite difficult for hearing-impaired children.

More importantly, the results suggest that hearing-impaired children use of implicit knowledge about relations between word meanings in a sentence influenced the identification of words whose acoustic cues are not clear. In other words, if the listener knows other parts of the passage, the contextual dependencies can compensate for the ambiguous acoustic signal, making the sentence intelligible (Miller, 1956). The

finding that children did better on the reasonable sentences than on the unreasonable ones is consistent with this interpretation. Presumably, the children did worse on the unreasonable sentences because the contextual information mislead them into selecting the wrong alternative.

This study used children with enough residual hearing to understand some sentences by hearing alone. In contrast to these hard of hearing children, many hearing-impaired persons have losses so severe that they often cannot understand spoken sentences without lipreading and signs.

Use of Contextual Cues in Discourse Comprehension

The second part of the presentation is a proposal for research on the comprehension of interpreted lectures by deaf students. Procedures are being developed for data collection, but results are not yet available. These ideas are tentative. Some of the ideas are extensions of ones suggested by the experiment described in the first section. National Technical Institute for the Deaf (NTID) is a post-secondary educational institution that is part of Rochester Institute of Technology. At NTID interpreters are used extensively to help the deaf students better follow the classroom lectures. Interpreters are present in classes where there are both deaf and normal hearing students. The signs, gestures, and lip movements of the interpreter provide information that for many deaf students is essential in order to follow the lecture.

This second part of the presentation then considers a quite different language comprehension situation than the one just described, but use of contextual cues seems relevant here also.

To give you a further feeling of how an interpreted lecture seems to the deaf student, I will first read this passage aloud. This passage,

from a lecture on schedules of reinforcement, seems typical of material an NTID student is expected to comprehend.

> Basically - the theory of behaviorism (or operant conditioning) says that if you follow a certain behavior by a positive reinforcement, that behavior will increase in frequency. So when a person gets a reward directly after doing something-that person will do more and more of that in the future. But Skinner also would say that if you stop giving the reinforcement (the food, money, praise), you'll extinguish the behavior. The behavior will gradually fade away because there's no pay off for the individual (Osguthorpe, Long and Ellsworth, 1978).

Now an interpreter will just sign the lecture and not use his voice. This may give you an indication of how the presentation would seem if the deaf student has no residual hearing.

In regard to severity of hearing loss, individuals who cannot understand sentences through the auditory modality may still benefit from context when the message is spoken and signed simultaneously. Hearing-impaired persons seem to integrate the two forms of information, and the integrated information may provide compensatory syntactic and semantic cues.

Prose is, of course, more "realistic" material than a string of unrelated sentences. Communication, whether by letter, conversation, or lecture, usually occurs in chunks of at least paragraph length.

The comprehension and memory of prose is facilitated by identification of the important pieces of information and organizing this information in relation to the central idea in the passage (Johnson, 1970; Kintsch, 1974).

The prosed research on lecture comprehension by students with severe hearing loses will be guided by the following preliminary ideas:

1. Paragraphs have central ideas.
2. Sentences are organized around this central idea.

3. Words in sentences can serve as contextual cues for identification of other words; i.e. they enhance other word's predictability

4. Students can use contextual cues to facilitate discovery of the central idea of the paragraph.

In other words, use of these contextual cues can aid comprehension of the paragraph- comprehension in terms of getting the central idea of the paragraph and interrelating the pieces of information in the paragraph.

Research with normal hearers (Clark and Begun, 1968; Moore, 1972) and with hearing-impaired individuals (Stinson, in press) suggests that students process lecture information by forming a central idea based on the first few words presented. As the lecture proceeds there is a constant narrowing down of what words are possible because the student expects the meanings of the subsequent words to be consistent with the semantic information evoked by the preceeding context. In this way, the contextual cues increase the predictability of subsequent words and aid lecture comprehension.

This reasoning suggests that the first few sentences in a passage should be more difficult to comprehend than later sentences. These initial sentences are not preceeded by contextual cues that can aid understanding. On the other hand, the student may be able to extract enough information from these initial sentences so that he can more completely comprehend later sentences. This tentative hypothesis is one I hope to examine in research on how deaf NTID students use contextual cues in lecture comprehension.

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TABLE 1

Examples of Two Sentences in

Their Forms with Reasonable,

Unreasonable and Neutral Context

	Reasonable
1a.	The little girl[a] has a pail.
2a.	You find goats on the farm.
	Unreasonable
1b.	The little dog has a pail.
2b.	You find the goats on the sea.
	Neutral
1c.	The pail was grey.
2c.	Look at the goat over there.

a. Key words in context are underlined twice

b. Test words are underline once